



**DAM SAFETY SECTION
CRITICAL INFRASTRUCTURE DIVISION**

Downstream Hazard Assessment

GENERAL INFORMATION

INVENTORY NO.: TX03582

DAM: Lake Deerwood Dam

OWNER: Lake Deerwood Owners Association, Inc.

STREAM: Unnamed Trib. of Brushy Creek BASIN: Cypress

LOCATION: 16 Miles NW of Marshall COUNTY: Harrison

DOWNSTREAM HAZARD CLASSIFICATION: See Report

DAM HEIGHT: 27 Feet SIZE: Small

NORMAL CAPACITY: 240 ac-ft MAX. CAPACITY: 396 ac-ft

INSPECTION DATE: May 22, 2012

PREVIOUS INSPECTION DATE: March 16, 2010

INSPECTION TEAM: Carol Hearn, P.E., C.W. Schneider, P.E.

PERSONNEL CONTACTED: Mr. Danny Rivers, Board Secretary

SUMMARY

Lake Deerwood Dam was visited on May 22, 2012, as part of a downstream hazard investigation.



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Additionally, a brief inspection of the dam was performed. The dam was found to be in overall poor condition, as in the previous inspection. Notable observations included:

- An 8-inch PVC siphon was installed over the embankment to maintain the water level below the level of the damaged principal spillway inlet [Photos 1-3],
- The damaged principal spillway was still in place, but was not engaged,
- The siphon was not engaged during the inspection,
- The previously noted erosion of the downstream slope remains, but has not further deteriorated since the water level has been lowered,
- The water level was measured with a hand level to be 3.6 feet below the crest of the principal spillway and 8.7 feet below the top of dam [Photo 4],
- Standing seepage was observed on the toe of the dam near the principal spillway [Photo 5],
- The high phreatic surface on the downstream slope that was observed in the March 2010 inspection (when the principal spillway was engaged) was not observed during the current inspection [Photo 6],
- Small trees were growing back from cut stumps [Photos 7-8], and
- Cut trees that were on the embankment in the March 2010 inspection had been removed.

BACKGROUND

According to TCEQ Dam Safety files, Lake Deerwood Dam was constructed around 1971. No plans relating to the construction of the dam exist in the files. The dam has been inspected by TCEQ Dam Safety staff on several occasions including 1975, 1984, 1988, and 2010.

The March 16, 2010 inspection found Lake Deerwood Dam to be in poor condition due primarily to the failed condition of the principal spillway. The invert of the steel pipe was badly deteriorated and had rusted out, allowing water to flow uncontrolled down the downstream slope. Erosion of the slope in the vicinity of the principal spillway was extensive and appeared to have been occurring for some time.

In a letter dated March 22, 2010, TCEQ notified Mr. Dwaine Lassiter of the poor condition of the dam and requested him to prepare a plan of action to include: 1) lowering the lake level as soon as possible, 2) retaining a licensed professional engineer, 3) compiling a list of names and phone

numbers for all affected downstream owners, and 4) contacting local emergency management officials to formulate a plan of action in the event of a dam failure.

On March 30, 2010, Mr. Lassiter submitted an Emergency Action Plan (EAP) for the dam, which was reviewed and ultimately accepted by TCEQ on October 12, 2010. This fulfilled the requirements for Items 3 and 4 listed above.

On April 6, 2010, Mr. Lassiter notified TCEQ that the Association had engaged the services of Winn Associates of Longview, TX to design a siphon.

On April 14, 2010, Mr. Lassiter notified TCEQ that a siphon had been installed to lower the lake level and that erosion of the embankment had ceased. This fulfilled the requirement for Item 1 above.

On August 4, 2010, Mr. Lassiter notified TCEQ that the Association had retained Johnson and Pace, Inc. (JPI), as their engineer. On December 10, 2010 TCEQ received a Hydrologic and Hydraulic (H&H) analysis from JPI prepared by Mr. Lane Roberts, P.E.

[REDACTED]

On September 1, 2011, House Bill 2694 from the 82nd Texas Legislative Session became effective. The bill exempted certain dams in Texas from provisions of the dam safety rules. Lake Deerwood Dam fell into the exempt category.

On February 3, 2012, Mr. Daniel Martinez, P.E. of JPI submitted plans and accompanying H&H analyses to support the spillway replacement. Comments were sent to Mr. Martinez on March 15, 2012.

[REDACTED]

[REDACTED]



PRE/POST INSPECTION INTERVIEW

Upon arriving at the dam, TCEQ inspectors were met by Mr. Danny Rivers, Secretary of the Lake Deerwood Owners Association. Mr. Rivers was informed of the TRC analysis and the need to field-verify the identified hazards, as well as the dimensions of the dam used in the breach calculations.

Mr. Rivers relayed the Association's efforts to salvage and repair the dam given the limited funds available to the Association. He also stated that upon lowering of the water level, an abandoned beaver den was discovered on the upstream slope on the left end of the embankment, in the vicinity of where the high phreatic surface was observed during the March 2010 inspection. Mr. Rivers reported that the beaver den had been repaired by collapsing the burrow and compacting it with clay material.

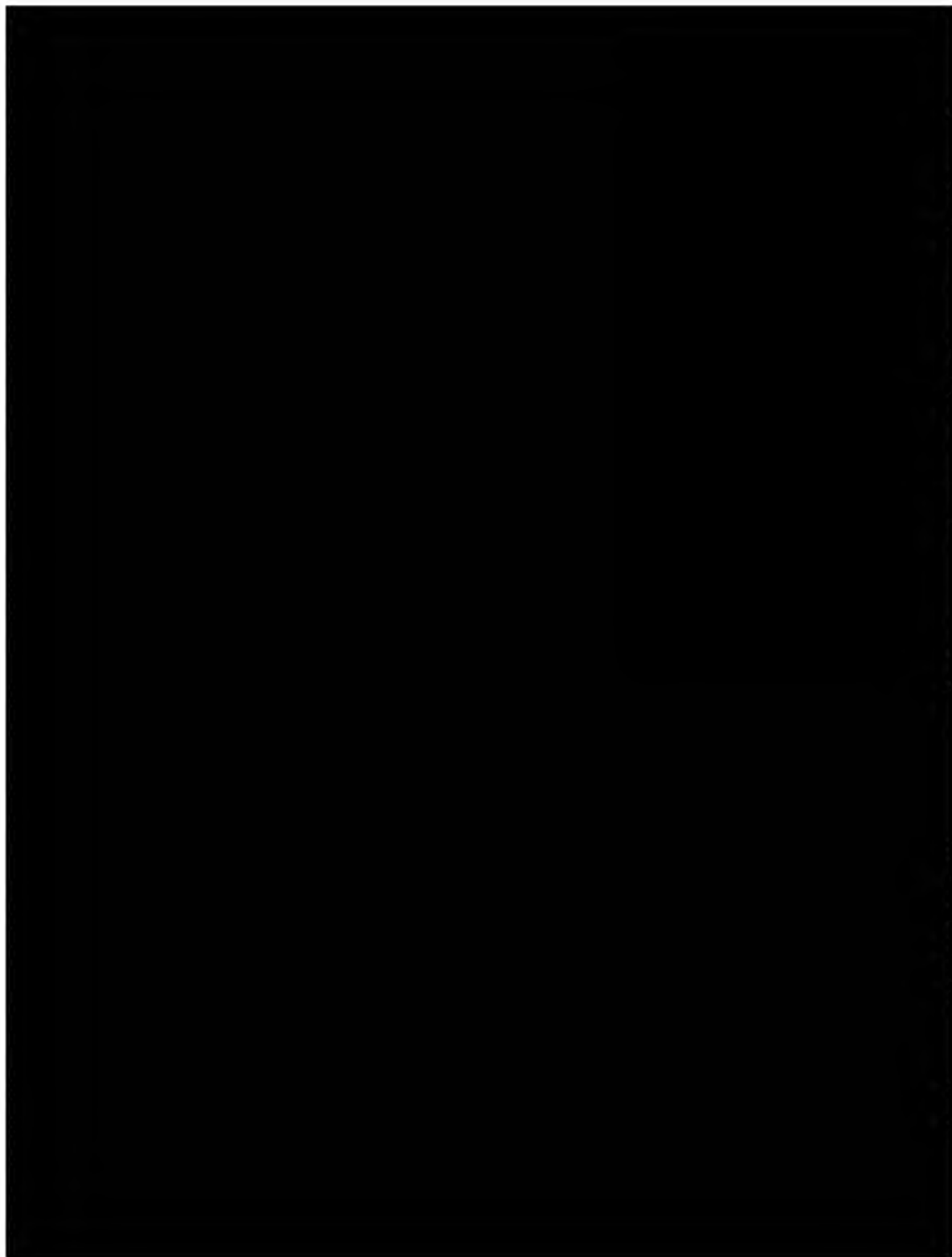
Mr. Rivers did not accompany the TCEQ inspectors on a driving inspection of the downstream area to observe potential hazards identified by the TRC analysis. No post inspection interview was conducted.

CURRENT INSPECTION

A hand level measurement of the dam height was taken. The height of the dam near the principal spillway, adjacent to the channel, was determined to be 24.5 feet. The inventory height of the dam is listed as 27 feet. Given that the channel at the principal spillway outfall is approximately 3 feet deep, the 24.5 feet measurement is generally in agreement with the inventory information. The 27 foot height also agrees with past measurements that were surveyed with more accurate equipment.

Figure 1 is a location map of the dam. Figure 2 is a sketch of the dam with photo locations shown. Figure 3 shows the overall inundation area of the dam. Figure 4 shows the inundation area immediately downstream of the dam. It should be noted that references to "left" and "right" are from the perspective of an observer facing downstream.

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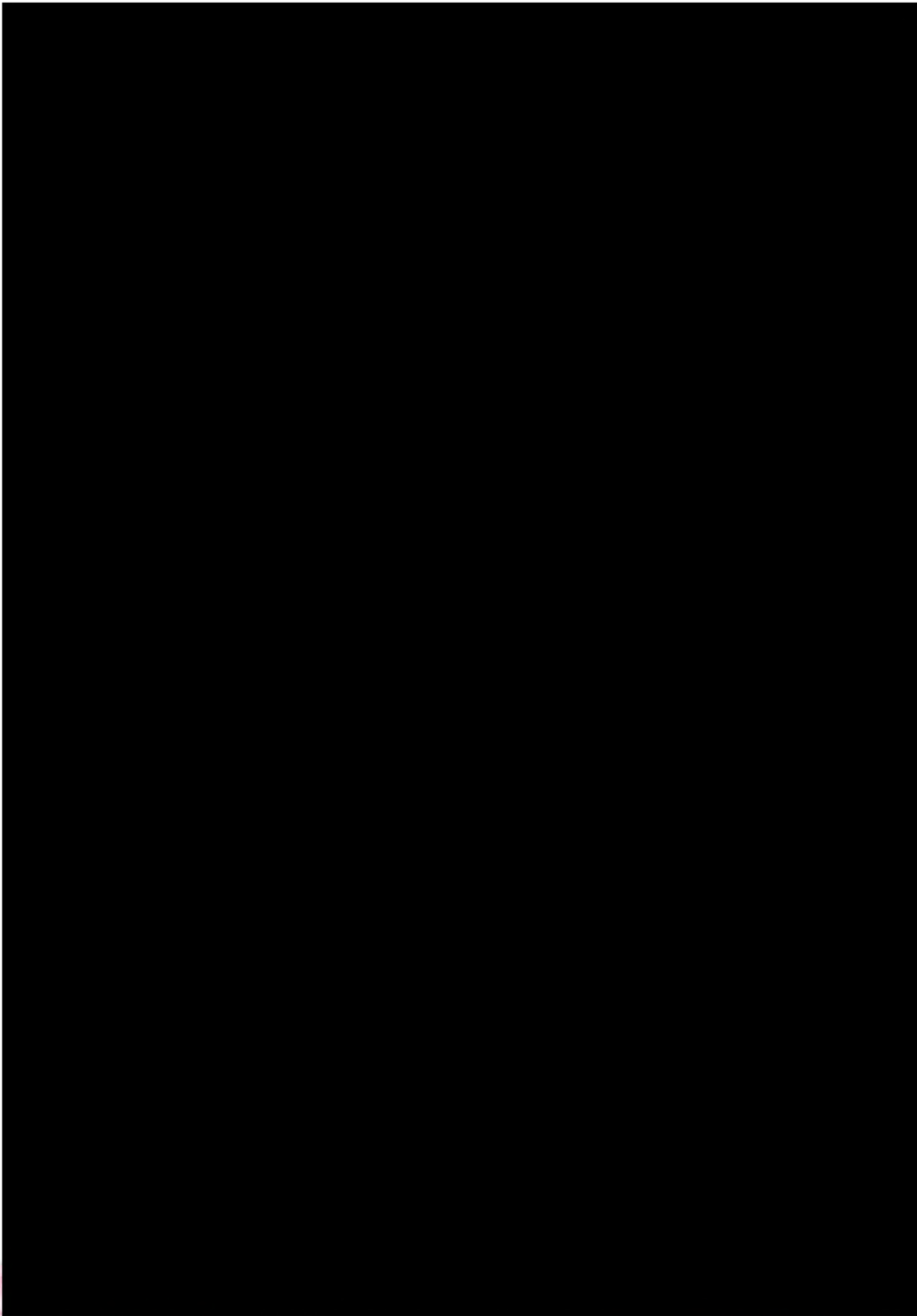
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OPERATION AND MAINTENANCE (O&M) PLAN

It is not known whether a written operation and maintenance plan exists for this dam.

RECOMMENDATIONS

1. 
2. Per 30 Texas Administrative Code (TAC) Chapter 299, §299.43(a), a written O&M plan is required to be developed.
3. The hydrologic/hydraulic analysis submitted to TCEQ on February 3, 2012 should be revised and completed to demonstrate safe passage of the 75% PMF. Please refer to the March 15, 2012 comment letter from TCEQ to JPI.
4. The construction plans submitted to TCEQ on February 3, 2012 should be revised and completed. Please refer to the March 15, 2012 comment letter from TCEQ to JPI. Please note that construction plans must be approved by TCEQ before construction may commence.
5. Given the poor condition of the dam, the lake level should be maintained at a level well below the invert of the rusted out principal spillway pipe until permanent repairs can be completed.

CONCLUSIONS

The dam was found to be in similar condition as in the March 2010 inspection. Some of the recommendations given in the 2010 inspection report have been addressed, primarily lowering the water level and removing cut brush from the slope. Draft construction plans for repair of the dam and construction of an emergency spillway were received by TCEQ on February 3, 2012. Comments were sent to the design engineer on March

15, 2012. To date, revisions to the plans have not been received, possibly due to the exemption status of the dam. [REDACTED]

This dam will be scheduled for re-inspection in two years or in conjunction with any repairs.



Charles W. Schneider, P.E.
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Figure 1: Location Map (Source: Google Maps)

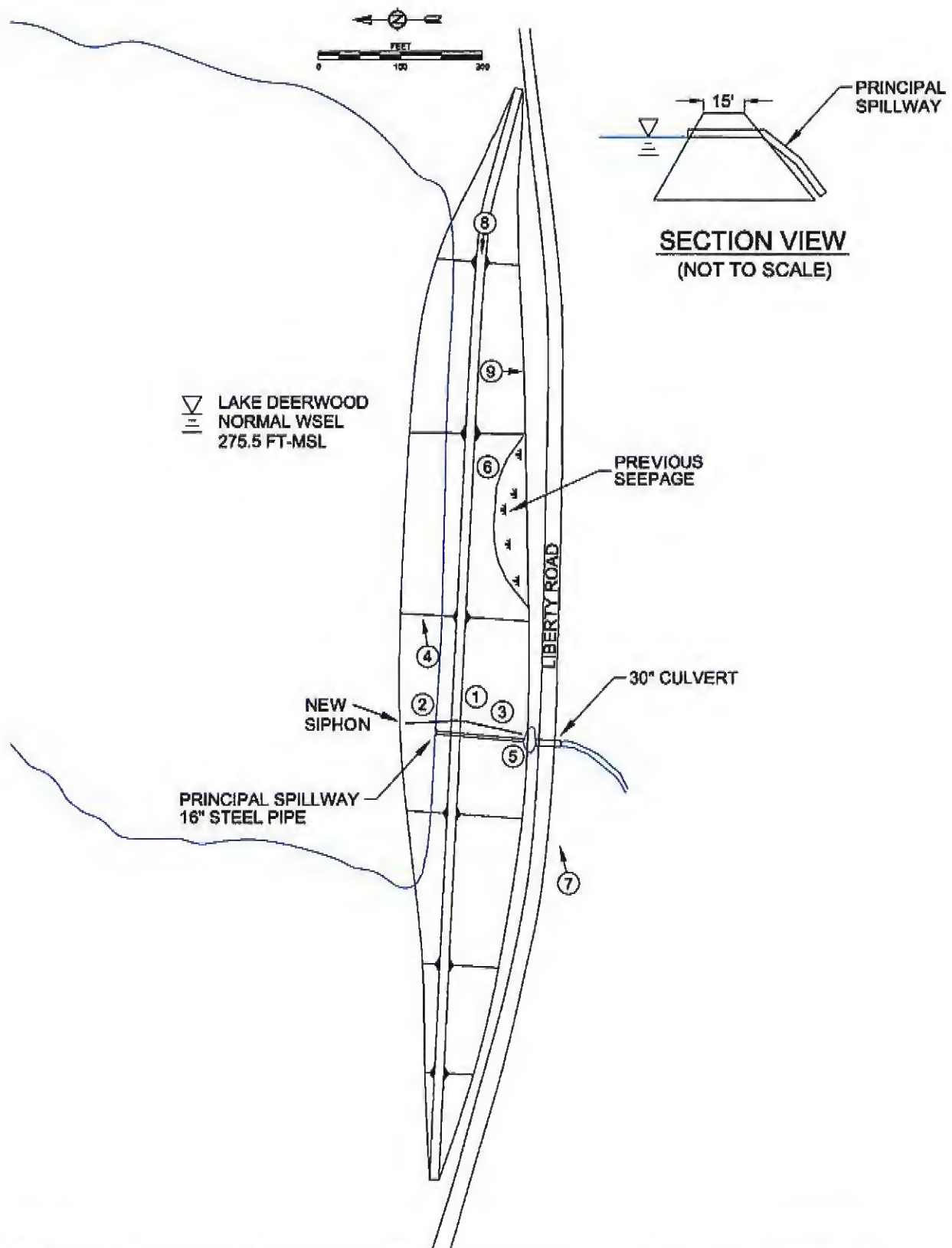


Figure 2: Sketch of Dam with Photo Locations

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Photo 1: View of the 8-inch PVC siphon that was installed to lower the lake level.



Photo 2: Upstream end of the siphon.

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Photo 3: Downstream end of the siphon. Note the existing deteriorated principal spillway pipe in the right of the photo.



Photo 4: View of the upstream slope and reservoir pool. Note the dock in the background is significantly higher than the water surface.



Photo 5: Standing seepage observed at the toe of the dam at the principal spillway pipe outlet.



Photo 6: Area of the downstream slope that was moist from seepage in the March 2010 inspection. The slope was dry during the current inspection. Mr. Rivers reported that a beaver burrow had been repaired on the upstream slope opposite this area.



Photo 7: Overall view of the downstream slope. Note the small trees re-growing from cut stumps. Also, note that the brush piled on the slope during the March 2010 inspection had been removed.



Photo 8: Another view of the dam from the left end of the crest.

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